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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/878,815	06/11/2001	Hassan S. Hashemi	00CON159PC-CIP1	3172

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EXAMINER

OWENS, DOUGLAS W

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 09/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/878,815

Applicant(s)

HASHEMI ET AL.

Examiner

Douglas W Owens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27, 29 and 31-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27, 29 and 31-55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 13. 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 – 3, are rejected under 35 U.S.C. 102(e) as being anticipated by US patent No. 6,232,650 to Fujisawa et al.

Regarding claim 1, Fujisawa et al. teaches a structure (Figs. 2 and 3) comprising:

a substrate (1) having a top surface for receiving a die (10);

a printed circuit board attached to a bottom surface of the substrate (Col. 11, lines 26 – 29);

a support pad (2) attached to the top surface of the substrate, the support pad being underneath the die, and being coupled to the die by a down bonding wire (13);

at least one via (6) in the substrate; and

said at least one via providing an electrical connection between a signal bond pad (11) of the die and printed circuit board (via bump electrodes (15) and pad (2)).

Regarding claim 2, Fujisawa et al. teaches a structure, wherein the die is a semiconductor die.

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Regarding claim 3, Fujisawa et al. teaches a structure, wherein the substrate comprises organic material (Col. 5, lines 44 – 48).

3. Claims 1 – 27, 29 and 31 – 55 are rejected under 35 U.S.C. 102(e) as being anticipated by US patent No. 6,191,477 to Hashemi

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1, 17, 27 and 44, Hashemi teaches a structure (Fig. 2) comprising:

- a substrate (220) having a top surface for receiving a die (100);
- a printed circuit board (130) attached to a bottom surface of the substrate;
- a heat spreader (290) attached to the bottom surface of the substrate;
- a support pad (240) attached to the top surface of the substrate, said support pad being underneath the die and coupled to the die by a down bonding wire (295);
- said support pad being connected to the heat spreader (Col. 5, lines 1 – 3);
- at least one via in the substrate;
- said at least one via providing an electrical connection between a signal bond pad of the die and the printed circuit board (Col. 4, lines 9 – 14); and

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a plurality of vias providing a connection between the die and heat spreader (Col. 5, lines 1 – 3).

Regarding claim 2, Hashemi teaches a structure, wherein the die is a semiconductor die (Col. 2, lines 59 – 61).

Regarding claims 3 and 31, Hashemi teaches a structure, wherein the substrate comprises organic material (Col. 3, lines 1 – 7).

Regarding claims 4 and 32, Hashemi teaches a structure, wherein the organic material is selected from the group consisting of polytetrafluoroethylene material and an FR4 based laminate material (Col. 3, lines 1 – 7).

Regarding claims 5 and 33, Hashemi teaches a structure, wherein the substrate comprises a ceramic material (Col. 3, lines 1 – 7).

Regarding claims 6, 34 and 52, Hashemi teaches a structure, wherein the at least one via provides an electrical connection between a substrate bond pad (260) and the printed circuit board (Col. 4, lines 9 – 14), wherein the substrate bond pad is electrically connected (270) to the signal bond pad of the die.

Regarding claims 7 and 35, Hashemi teaches a structure, wherein the via abuts the substrate bond pad.

Regarding claims 8, 13, 14, 22, 36 and 41, Hashemi teaches a structure, wherein the substrate bond pad (260) is electrically connected to the signal bond pad (300) of the die by a signal bonding wire (270).

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Regarding claims 9, 37 and 53, Hashemi teaches a structure, wherein the via provides an electrical connection between the signal bond pad of the die and a land (280), said land being electrically connected to the printed circuit board.

Regarding claims 10 and 38, Hashemi teaches a structure, wherein the via abuts the land.

Regarding claims 11 and 39, Hashemi teaches a structure, wherein the via provides an electrical connection between a substrate bond pad (260) and a land (280), wherein the substrate bond pad is electrically connected to the signal bond pad (300) of the die, and wherein the land is electrically connected to the printed circuit board.

Regarding claims 12 and 40, Hashemi teaches a structure, wherein the via abuts the substrate bond pad and the land.

Regarding claims 15, 42, 43, 54 and 55, Hashemi teaches a structure, wherein the vias comprise copper (Col. 3, lines 32 – 35).

Regarding claims 18 and 45, Hashemi teaches a structure, wherein the heat spreader is attached to a printed circuit board (Col. 4, lines 33 – 37).

Regarding claim 19, Hashemi teaches a structure, wherein the heat spreader is an electrical conductor (Col. 3, lines 16 – 21).

Regarding claims 20 and 47, Hashemi teaches a structure, further comprising a substrate down bond area attached to the top surface of the substrate.

Regarding claims 21 and 48, Hashemi teaches a structure wherein the vias provide an electrical connection between the substrate down bond area and the heat spreader (Col. 5, lines 1 – 3).

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Regarding claims 23 and 25, Hashemi teaches a structure, wherein the heat spreader is attached to a printed circuit board by solder (Col. 4, lines 33 – 37).

Regarding claim 24, Hashemi teaches a structure, wherein the heat spreader is a thermal conductor (Col. 3, lines 16 – 21).

Regarding claims 26 and 46, Hashemi teaches a structure, wherein second vias in the substrate provide a connection between a signal bond pad (300) of the semiconductor die and a printed circuit board (Col. 4, lines 9 – 14).

Regarding claims 29, 50 and 51, Hashemi teaches a structure, wherein the first vias provide a thermal and electrical connection between the semiconductor die and heat spreader (Col. 3, lines 32 – 36).

Regarding claim 49, Hashemi teaches a structure, wherein a ground bond pad on the semiconductor die (Col. 3, lines 52 – 56; Col. 4, lines 12 – 14) is electrically connected to the substrate down bond area by a down bonding wire.

Response to Arguments

4. Applicant's arguments with respect to claims 1 – 27, 29 and 31 – 55 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 703-308-6167. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

DWO

